WHY ARE MODERN INFECTIOUS DISEASES MILD?

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To offer an hypothesis explaining a phenomenon before being sure that the phenomenon exists is perhaps more a relaxation than a contribution to serious discussion.

Let me say that in offering an hypothesis to account for the relative mildness of modern smallpox, modern scarlet fever, etc., as compared with ancient, I feel that I am handicapped by lack of proof that they are relatively milder; and, instead of proof, I must offer the widespread but indefinite "general impressions" of a great many of the older physicians; the descriptions of these diseases as given by many of the older writers; and the statistically derived but only subconsciously credible apparent falling off in the mortality rates.

Against each of these sources of belief stands one or more possible fallacies. The decrease in the severity of disease as it presents itself to the old physician, looking backward, may be no more than an illusion, due to the greater impression made on his mind as a young man just setting out to establish his practice, by the cases he saw then, as compared with the smaller impression quite similar cases may make on him now; or it may be due to the fact that a physician is apt to judge by end results; and because modern treatment saves patients that would have died years ago, it seems to him to mean decrease in the severity of the disease, although it means only an increase in the potency of the treatment.

The descriptions of the older writers must be discounted also, for we all know that it is not very long since only severe forms of disease were recognized—since patients were hardly considered as sick unless they were nearly dead. It is easily within the memory of all of us that mild diphtheria, mild scarlet fever, etc., were looked on as innovations, hardly worth serious study, dreams of the faddists. Naturally all the old writers discussed and emphasized the severe typical cases—and naturally the impression arises that only such cases existed.

The comparison of older statistics with those of today to determine the relative deaths against relative populations would be of considerable moment had we any reason for confidence in either the figures for deaths or the figures for populations.

We know that both of these essentials are far from reliable now—we guess on good grounds that they were far worse fifty years ago. As for relative deaths to relative cases, we do not dream that these are any where nearly accurate now—and they certainly were not then.

Notwithstanding all this lack of definite proof I assume that the widespread impression of relative mildness today does correspond with the facts, in smallpox, diphtheria, and perhaps in tuberculosis, at least; although my own tentative belief embraces also most of the other specific non-venereal infections.

At all events, explanations are often offered for this alleged present-day mildness. Perhaps the most often offered is the most fallacious of all. This is the explanation which attributes the mildness to a gradually accumulating inherited immunity, affecting the race as a whole.

The fallacy lies here: admitting for argument's sake, that immunity might be acquired by the race as proposed, how long has the race been acquiring it? This immunity has shown its effects only in the last 100 years—or 50, or 30, depending on the authority and the disease. But the human race has existed 6,000 years (more likely 100,000). The human race has suffered these diseases 6,000 years (more likely 100,000). What sort of gradually acquired inherited racial immunity would that be which showed no effect for 180 generations (more likely 3,000) and then sprang up fully armed in the last two or three?

Sometimes the explanation (of mild smallpox at least) is based on gradually acquired inherited immunity from artificial vaccination. That explanation has the merit—a limited merit it is true—that it does take into account the recent development of the mildness, although only for the one disease, smallpox. But this has its fallacies also. First, the mildness of present-day smallpox does not seem to have developed gradually since vaccination first came into use. It seems to be confined to the last twenty or thirty years, or even less. Second, the present mild smallpox is not confined to the much vaccinated races, but flourishes everywhere. Last, and most important of all, how is it possible to consistently conceive the development in one hundred years of inherited immunization from cowpox, which itself protects the vaccinated only five years, when the virile and life-long protection afforded by virulent smallpox had operated in the race for thousands of years without any such effect at all?

The second most commonly offered explanation of the present day mildness of the infectious diseases is "improvement in general sanitation." Here again we have no human statistics which are conclusive. If we may judge from the testimony of careful breeders of prize stock, however, the tendency of hygienic surroundings is to make animals more susceptible to infections rather than less—and it certainly does not become us at this stage to claim that the race now crowding into cities and living in

auto and smoke dust is under more sanitary conditions than our forefathers, out in the country. I doubt if the careful inquiries we so talk about, but don't make, into the actual case-rate fatality of the infectious diseases, would show more deaths per cases in "unsanitary" surroundings than in "sanitary" ones. Every one knows that the obstetrician fears infection more in the rich man's home than in the slums.

The third explanation, already partially dealt with, is that of improvement in treatment. But this evidently does not apply, for the vast majority of the mild cases of smallpox, scarlet fever, etc., of today are not treated by physicians—in fact most of them are not seen by physicians at all! How is it possible that improvements in treatment *which are not used*, could affect the diseases—unless we cynically say that after all this very absence of treatment is itself the improvement?

In brief, it appears that existing explanations are fallacious, and that no long continuing, gradually developing old factor in life is adequate.

There must have been some new factor, something tremendously powerful, tremendously widespread, and yet thoroughly well disguised.

I offer for discussion the hypothesis that this factor was Lord Lister's introduction of surgical antisepsis and asepsis, and the following sequence of arguments in support:

Call to mind the fearful condition of hospitals, fifty, even thirty and twenty years ago, such that the hospital death-rates in major surgery reached to 60 to 80 per cent. Call to mind that these deaths were only the high-water marks of widespread blood poisonings, putrid wounds, gangrenes, and "laudable pus." This means that the hospitals, the patients, the practitioners who attended them, formed one great combination for the breeding, increasing of virulence and prompt widespread distribution of strepto- and staphylo-cocci. The practitioner of that day carried, as we all know, strepto- and staphylo-cocci to his obstetric cases. We all remember the discovery of the cause of puerperal septicemia and the prompt measures that followed, practically abolishing it. But the practitioner carried these germs not only to obstetrical cases, but to all, hence also to smallpox and consumption, to scarlet fever and measles, to diphtheria and whooping-cough.

True it was not recognized then, as it is now, that the non-specific infections with strepto- and staphylo-cocci do more harm in these diseases than the original specific infections themselves. But now, we recognize this and it is time to take cognizance of it.

We have learned to abolish surgical infection by appropriate bacteriological technique. We are learning to abolish cross infections in contagious hospitals, also by appropriate bacteriological technique, borrowed in many respects from the surgeons. What we need now is still further to extend this technique to the care of all septic medical cases, whether they

suffer from the specific infections or not; for if we abolish the strepto- and staphylo-cocci from the ordinary infectious diseases, we shall practically abolish the diseases themselves—that is we shall leave them so mild as to be almost negligible.

SUMMARY.

1. Although we should hold as our ultimate aim the abolition of the specific infectious diseases, it is well to remember that the chief harm that they do is due to strepto- and staphylo-cocci as secondary infections.

2. As a life-saving proposition, the abolition of strepto- and staphylococci deserves more strenuous attention than the abolition of even the tubercle bacillus—ranking in this with the abolition of syphilis and gonorrhea.

3. The mildness of modern infectious diseases is due to the lessened virulence, smaller stock, and reduced distribution of the strepto- and staphylo-cocci formerly bred in our hospitals; and is to be ascribed to Lord Lister, who, however, probably did not foresee this development.

4. Public health men should campaign for medical asepsis as the surgeons did formerly for surgical asepsis; and not only in contagious hospitals, handling the specific infections, but also wherever septic cases are cared for. Indeed, we should probably gain immensely if all septic cases were isolated, as smallpox, etc., are now.